United Nations A/72/292

General Assembly

Distr.: General
4 August 2017

Original: English

Seventy-second session
Item 24 (c) of the provisional agenda*
Eradication of poverty and other development issues: human resources development

Human resources development for the twenty-first century

Report of the Secretary-General

Summary

Human resources development is fundamental to fulfilling the commitment of the 2030 Agenda for Sustainable Development to leave no one behind. The present report makes the case that approaches to human resources development must increasingly focus on enabling all individuals to effectively navigate the challenges and opportunities of the twenty-first century, including those arising from the next generation of technologies and scientific advances. It highlights the major global drivers of change in labour markets, the challenges associated with the future of work and their implications for human resources development. The report also explores the types of education and training that are needed to equip people for the future of work, in particular to match their skill sets with projected labour market trends. Thus, institutional adaptation will be required at the national level, especially within education and training systems, as well as social protection systems. The report outlines the role of the United Nations system in support of countries' efforts to design and implement human resource development strategies, as an essential tool for the achievement of the Sustainable Development Goals.

* A/72/150.

17-13421 (E) 220817

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I. Introduction

1. This is a period of considerable human potential. Despite serious obstacles to poverty eradication and sustainable development, people everywhere are benefitting from achievements in education, health and living standards that would have been unimaginable to previous generations. Advances in science, technology and innovation and new sources and access to data and information are expanding opportunities for prosperity while paving new pathways for preserving the planet. Leaving no one behind by such impressive progress is one of the defining challenges of our time. It is also a central promise of the 2030 Agenda for Sustainable Development: human resources development is fundamental to fulfilling this commitment.

2. The 2030 Agenda builds on and strengthens the work done by the United Nations and its partners on human resources development since the Organization's early years. In the 1960s, there was a growing awareness that investment in education and training was as important as financing for development.[1] During this period, the United Nations also put an international lens on the issue by bringing attention to skills shortages resulting from the migration of skilled individuals from developing to developed countries.

3. Originally, human resources development was narrowly defined in terms of labour supply and skills provision. The concept of human resources development, however, has evolved to encompass a wide range of elements necessary for building the full capacities and capabilities of people. This concept helped to drive the human development approach that emerged in the 1990s, underlining that people are both the agents and beneficiaries of development. As such, inclusive and sufficient human resources development is a fundamental precondition for poverty eradication and sustainable development, as well as the overall objective of development.[2]

4. Investments in basic education and training, as well as health and gender equality, are critical enablers for individuals to develop their full human potential and for societies to reap the associated gains. But, focusing on basic needs is not enough, since human capacities and capabilities cut across the economic, social and environmental dimensions. With the mainstreaming of sustainable development, the interlinkages between human resources development and issues such as social protection, energy and food security, agriculture and rural development, and international migration, among others, have been recognized.[3] While this has increased the complexity of human resources development as an all-encompassing concept, its broad scope provides new avenues for pursuing integrated approaches in the design of national development strategies and in international cooperation.

5. The United Nations promotes a comprehensive approach to human resources development with a view to enabling individuals to effectively navigate the challenges and opportunities of the twenty-first century. The impacts of the next generation of technologies and scientific advances have only started to be felt. Since globalization is intensifying and labour markets are increasingly connected, renewed attention should be paid to human resources development in all countries. The daunting nature of many of the biggest issues facing our planet is transboundary in nature. This compels us to harness the potential of our collective human capacities for solutions. Thus, inclusive human resources development is essential

[1] R. Jolly and others, *UN Contributions to Development Thinking and Practice* (Indiana University Press, 2004).

[2] See Economic and Social Council resolution 1989/120.

[3] See General Assembly resolution 66/217.

not only to ensure that every individual has the opportunity to obtain a livelihood, but also to increase humanity's chances for peace and prosperity.

6. While many countries have integrated human resources components into their development strategies, budgetary constraints pose challenges, in particular in the public education and health sectors. At the national and regional levels, investments in, and the development of, inclusive human resources development strategies will therefore be critical to leaving no one behind. At the global level, normative frameworks are needed to effectively address emerging issues so that they yield opportunities for all and do not harm the planet.

II. The future of work

7. The world of work is changing significantly everywhere, with effects on shifting demands for human resources and skills. For the workforce, there are negative and positive aspects to the profound changes under way in technology, globalization, employment and demography, while some of their effects are impossible to predict. Broadly, national Governments and other key actors, whether certain business sectors, organized labour or other groups, have had difficulty in keeping pace with the rate and direction of changes. Too few people benefit from the most promising advances, with the possibility that the excluded and vulnerable may fall even further behind.

8. However, the future of work is not a fait accompli there is the potential to shape its course. The 2030 Agenda promotes a vision of people-centred economies and inclusive societies, where poverty eradication and sustainable development are prioritized and decent work for all is achieved. In the national implementation of the 2030 Agenda, there is broad scope for investing in human resources development in sectors that are especially relevant for the transition to a more sustainable future. Recent analysis showed that sustainable business models could open economic opportunities worth up to $12 trillion and increase employment by up to 380 million jobs by 2030.[4]

9. There are major opportunities to be seized, such as employment gains from the creation of additional decent jobs through investments in the education, health and the social sectors. For example, the World Health Organization estimates that there is a potential need for an additional 18 million health workers if universal health coverage is to be achieved and sustained by 2030, primarily in low- and middle-income countries. Furthermore, the shift to green economies offers numerous growth and work opportunities in areas such as renewable energy and climate change adaptation and mitigation. Improvements in job quality and wages on a large scale could be generated by a shift to more productive processes and sustainable products and services. The increased accessibility of and capacity for livelihoods and public participation will help to promote social inclusion, especially of women, youth and other marginalized groups.

Current employment trends

10. Current employment trends paint a challenging picture as the result of decreasing employment in intensity of some sectors, wage stagnation and income inequality, as well as vulnerable employment in many developing regions. Global unemployment levels and rates are expected to remain high, at around 201 million

[4] Business and Sustainable Development Commission, *Better Business, Better World* (London, 2017). Available from http://report.businesscommission.org/uploads/BetterBiz-BetterWorld_170215_012417.pdf.

people unemployed. The global unemployment rate is predicted to remain steady in 2018, but the increase in the population of job seekers will continue to outpace job creation.

11. Labour market conditions are worsening in emerging economies. Structural unemployment poses problems in developed countries. In many developing countries, poor-quality employment and working poverty are widespread and chronic. [5] Workers in vulnerable employment account for 1.4 billion people worldwide, representing nearly four out of five workers in developing countries. Their prospects for decent work are expected to only marginally improve in the years ahead.

12. Job polarization is a significant trend, with rising employment among high and low-skilled workers that is increasingly linked to technological change within and between sectors. Evidence shows that the patterns of change in the skills composition of jobs differ widely across countries. Numerous are countries experiencing job polarization because of a loss of medium-skills-intensive jobs and an increase in the proportion of jobs at the high and low ends of the skills spectrum.

13. Wide disparities in labour markets among different demographic groups are common across countries, underlining the importance of human resources development strategies that prioritize inclusiveness. Gender disparities in labour markets are especially pronounced. Although the challenge is universal, the gender gap in some regions is vast, with women more than twice as likely to be unemployed as men. This will require tailored approaches to national circumstances, rooted in international commitments to gender equality and women's empowerment.

Technological change

14. Rapid advances in science, technology and innovation are transforming economies and societies, with subsequent effects on how people prepare for, access and obtain work. Past and present debates about the future of work tend to focus on technology and efforts to control and influence it, especially its "disruptive" potential. [6] Although work-related disruption is often associated with the negative effects of technological change, such as job dislocation, economic history has also shown its positive effects, such as the creation of new, better and safer, jobs. [7]

15. Previous periods of rapid technological change in the world of work have proven the complexity of disruption. The industrial revolution that spanned the eighteenth and nineteenth centuries was characterized by new innovations and advances in manufacturing, transport and other sectors in industrialized countries. This was accompanied by a shift of the population away from work in agriculture and handicrafts in predominantly rural areas to new opportunities in manufacturing and commerce in urban areas. The changes associated with the industrial revolution laid the groundwork in the twentieth century for increased productivity and global interconnectivity, with a growing emphasis on consumption and digital technology, especially in the richest countries.

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[5] International Labour Organization (ILO), *World Employment and Social Outlook: Trends 2017* (Geneva, International Labour Office, 2017). Available from www.ilo.org/global/research/global-reports/weso/2017/lang--en/index.htm.

[6] World Bank, *World Development Report: Jobs* (Washington, D.C., 2013). Available from http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1320950747192/8260293-1322665883147/WDR_2013_Report.pdf.

[7] Laurence Chandy, ed. *Disrupting Development with Digital Technologies. Brookings Blum Roundtable 2016 Post-Conference Report* (Washington, D.C., The Brookings Institute, 2017). Available from www.brookings.edu/wp-content/uploads/2016/07/Br_Aspen15_final.pdf.

16. Experience demonstrates that each new wave of technological breakthroughs tends to accelerate the next phase of development. In a recent study, it was estimated that in the course of the industrial revolution in the United Kingdom of Great Britain and Northern Ireland it took more than 150 years for the country to double its gross domestic product (GDP) per capita (from a starting population of around 9 million).[8] More recently, China doubled its gross domestic product per capita in just 12 years, (based on a population of 1 billion people) and India took 16 years to do the same (with around 900 million people). Technology played a key role in driving changes in the economies of those countries, with diverse policy and regulatory frameworks that helped to support widespread public education, nurture innovation and encourage growth and development.

17. The scale and pace of change presented by many of the current, most cutting-edge advances in the digital, physical and biological spheres has been referred to as a "fourth industrial revolution", which, it is argued, may be fundamentally different from preceding periods.[9] Breakthroughs in fields with promising, though distant futures, including artificial intelligence and machine learning, robotics, nanotechnology, three-dimensional printing, genetics and biotechnology, are now expanding at an exponential pace and amplifying one another in unprecedented ways.[10] Although the growth of opportunities in those fields has been considerable, there are still large gaps in the human resources required to support them.

18. The dynamic process of job destruction and creation involves significant changes and adjustments by Governments, workers, private sector actors and communities that can be difficult and costly. The growing disruption in certain sectors and occupations in many countries has resulted in the elimination of jobs, leading to economic hardship, inequality and vulnerability in many countries. Some experts expect persistent unemployment stemming from the disruptive effects of technological development,[11] or even more pessimistically, the prospect of a jobless future.[12]

19. The impact of such disruption on work and on the population of different countries will vary based on how such gains are distributed between economic and social groups. Over the past 200 years, technological change has generally been associated with wage stagnation and increased inequality, at least temporarily.[13] Developing countries face challenges and many are still making efforts to strengthen their education and social protection systems alongside a global backdrop in which the benefits of advances in science, technology and innovation are limited or inaccessible, with several notable exceptions, such as mobile technology.

20. Nevertheless, caution is needed when estimating job losses or jobs replacements as the result of technology, especially in developing countries where

[8] Richard Dobbs, James Manyika and Jonathan Woetzel, *No Ordinary Disruption* (McKinsey Global Institute, 2016).

[9] Klaus Schwab, *The Fourth Industrial Revolution: what it means, how to respond* (World Economic Forum, 2016). Available from www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

[10] Irmgard Nübler, "New technologies: A jobless future or golden age of job creation?", Research Department Working Paper 13 (Geneva, International Labour Office, 2016). Available from www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_544189.pdf.

[11] Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age: Work Progress and Prosperity in a Time of Brilliant Technologies* (Norton, 2014).

[12] Martin Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future* (Perseus, 2015).

[13] James Bessen, *Learning by Doing: The Real Connection between Innovation, Wages and Wealth* (Yale University Press, 2015).

there is a relatively little data and more research about such trends is needed. There is a difference between the probability that a job could be automated and the probability that it will be automated, and the gap between the two is greater in developing countries.[14] Another possibility is that disruptive technologies may not destroy entire occupations, but rather force the evolution jobs and skills needed within certain sectors.

21. While the direct impact of productivity-enhancing innovations will alter, and in some cases end, certain jobs, it could also trigger new economic activities and create jobs. This could result in net positive job creation in aggregate.[15] Entrepreneurs design and develop new goods and services, new business models and new jobs through which new occupations will emerge. Another factor to consider is the potential of technology-driven productivity to translate into higher wages, greater purchasing power and reduced prices, enhancing demand for domestic products, expanding output and compensating for any job loss. Labour and time-saving technology also lead to a higher demand for leisure, creating new jobs and industries.[15]

22. Those possibilities highlight new areas for future human resources development. Innovation and technological change have enhanced the complexity and level of skills required for existing jobs while also creating new jobs with greater skill levels.[15] Employment growth is expected to derive mostly from smaller, generally high skilled job families, that will not have the capacity to absorb job losses coming from other parts of the labour market. In this context, opportunities for significant reskilling and for improving skills are critical.

23. Proactive policies will be needed to address the changes introduced by technology. The ability to do so will prove particularly challenging in developing countries, owing to institutional constraints and gaps in resources and capacities. Outside of such economic hubs as China and India, most people in developing countries lack the adequate skills and the access to infrastructure , which makes strengthening education, skills development and "hard" and "soft" infrastructure the strategic areas for focusing national action and development cooperation.[16]

Globalization and the evolution of employment models

24. The organization of work and production is also changing as the result of globalization. Geographical fragmentation, the financialization of the economy and the expansion of global value and supply chains have all played a role in changing how firms develop their workforce. The outsourcing of labour-intensive tasks has resulted in the fragmentation of production processes across borders and the relocation of low-skilled jobs from developed countries to low-wage countries.[16] Employment has become internationalized as production systems have become

[14] ILO, *New Automation Technologies and Job Creation and Destruction Dynamics*. Employment Policy Brief (Geneva, International Labour Office, 2017). Available from www.ilo.org/employment/Whatwedo/Publications/WCMS_553682/lang--en/index.htm.

[15] Irmgard Nübler, "Technological changes and work in the future: Making technology work for all", Future of Work, Issue Note Series No. 1 (Geneva, International Labour Office, 2016). Available from www.ilo.org/global/topics/future-of-work/WCMS_534201/lang--en/index.htm.

[16] Carl Benedikt Frey and Ebrahim Rahbari, "Do labor-saving technologies spell the death of jobs in the developing world?" in *Disrupting Development with Digital Technologies. Brookings Blum Roundtable 2016 Post-Conference Report*, Laurence Chandy, ed. (Washington, D.C., The Brookings Institution, 2017). Available from www.brookings.edu/wp-content/uploads/2016/07/Br_Aspen15_final.pdf.

increasingly global and fragmented in scope. In 2015, one in five workers was estimated to work in global supply chains.[17]

25. Global supply chains have become the norm in many manufacturing processes, and they are increasingly penetrating the services sector. This results from the persistent search for productivity growth and the shift in firms' specialization in certain niches and tasks within specific countries. For example, most developed economies have focused on specializing, including in research and development, design and finance, among others, while developing countries specialize in more labour-intensive sectors, with some notable exceptions such as software development and business services.

26. An emerging concern for developing countries is the prospect of "reshoring". Reshoring occurs when the production of labour-intensive manufacturing shifts back to developed countries from developing countries, as the result of lower costs of production owing to automation and new technologies. The International Labour Organization predicts that this emerging trend will likely have the strongest negative impact on women's employment in developing countries, given their disproportionate concentration in industries that are likely to be affected.[18]

27. Another trend is the increased diffusion of work through networks of entities and individuals, rather than within a single firm. New technologies enable new forms of work organization and work arrangements. This reduces firms' reliance on core full-time employees for fixed functions and increases the involvement of employees in other countries or in non-standard forms of work, like external consultants and contractors.[19]

28. Information and communication technologies (ICTs), including the digital economy, have also led to new forms of production and employment, such as the "gig economy", crowdsourcing, telecommuting, co-working spaces, virtual teams, freelancing and online talent platforms. Those trends can blur the physical boundaries of the office or factory floor and redefine boundaries between professional and private life.[20] While they can result in more efficiency for business and increased flexibility for workers, they also generate new forms of precarious work and have profound consequences for policies and institutions related to social protection systems.

Demographic changes and migration

29. The future of work will be shaped, in part, by the global demographic situation, which is currently facing a situation of an ageing population in some countries and a rapidly expanding youth population in others. In countries where the working-age population is rising, there are opportunities to benefit from the demographic dividend to drive growth. In countries where ageing and slowing population growth are the reality, there are potential risks of economic stagnation

[17] ILO ,*World Employment and Social Outlook Trends 2015* (Geneva, International Labour Office, 2017). Available from http://www.ilo.org/global/research/global-reports/weso/2015/WCMS_337069/lang--en/index.htm.

[18] International Labour Organization, *New Automation Technologies and Job Creation and Destruction Dynamics*.

[19] Christiane Kuptsh and others, "The Future of Labour Supply: Demographics, migration, unpaid work". Future of Work, Issue Note Series No. 2 (Geneva, International Labour Office, 2016). Available from www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_534204.pdf.

[20] Valerio De Stefano, "The rise of the 'just-in-time workforce': On-demand work, crowdwork and labour protection in the 'gig economy'", Conditions of Work and Employment, Series No. 71 (Geneva, International Labour Office, 2016). Available from www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_443267.pdf.

and critical resource and service gaps. The relationship between population age structure and economic outcomes demonstrates that these trends are not necessarily deterministic, but rather mediated by the policy choices made within countries.[21]

30. Between now and 2030 the world economy needs to create over 600 million new jobs.[19] The working-age population of many developing countries will continue to grow and there are not enough jobs for them. Even when the private sector is growing rapidly, the share of the labour force that can be absorbed does not always keep pace with population growth. This partly explains the large share of the informal labour force in developing countries.

31. Unemployment disproportionately impacts youth. In 2015, 43 per cent of the global youth labour force was either unemployed or living in poverty despite having a job, owing to a lack of decent work. This limited access to the world of work for today's youth is unsustainable, and jeopardizes the achievement of the 2030 Agenda. There is a need for broader and integrated strategies that can boost human resources development through expanded opportunities for youth.

32. Concurrently, people are living longer, healthier lives and having fewer children, resulting in ageing populations in many countries. In Europe, 25 per cent of the population is aged 60 years or over, and this percentage is projected to reach 35 per cent by 2050.[22] Ageing is an emerging concern even in countries with populations that are growing fast and in countries at the beginning of a demographic transition. It will take only one generation until almost all societies start ageing.[19] This presents challenges to social protection systems and a demand for certain types of workers.

33. Many demographic shifts amplify the geographic mismatch of jobs. Between 2010 and 2030, 60 per cent of the increase in the workforce will come from Africa and Southern Asia where school attainment is lagging. Highly educated regions will see a decline in working-age adults as their population ages. In sub-Saharan Africa and South Asia, demographic changes, and unequal access to education, are causing a surplus of low-skilled workers and a shortage of medium-skilled workers.

34. Migration is likely to intensify as demographic transitions continue, and as a lack of decent work opportunities remains widespread in developing countries. In 2015, 244 million people were classified as international migrants, an increase of 41 per cent since 2000.[19] Between 2009 and 2016, the share of the working-age population willing to migrate abroad permanently increased in almost every region of the world.[5] Although reasons for migration are complex and varied, improved access to better jobs and livelihoods is among the principal factors. However, international migration at or around current levels will not compensate for the ageing population and low fertility levels.[22]

III. The future of education and training

35. Education, training and skills development are the core of human resources development and will need to be adapted to current and anticipated changes in the world of work. Broadly, this will require ensuring that education and training systems continue to improve, including through raising the quality and relevance of

[21] Andrew Mason and others, "Support Ratios and Demographic Dividends: Estimates for the World", Technical Paper 2017/1, Population Division, (New York, Department of Economic and Social Affairs, 2017). Available from www.un.org/en/development/desa/population/publications/pdf/technical/TP2017-1.pdf.

[22] Department of Economic and Social Affairs, *World Population Prospects 2017*. Available from https://esa.un.org/unpd/wpp/.

programmes and institutions for learning. Much work lies ahead given the trends that characterize the future of work.

36. Currently, global literacy is higher than ever, and considerable gains in education enrolment have been made over the past 15 years. Worldwide, adjusted net enrolment rates were 91 per cent for primary education, 84 per cent for lower secondary education and 63 per cent for upper secondary education in 2014.[23] Enrolment in higher education has also grown steadily, with the number of students in higher education institutions doubling from 100 million to 207 million between 2000 and 2014.[24]

37. Approximately 358 million youth worldwide are neither in employment nor in education and training, and young women are particularly affected in most regions, with the most severe gender gaps in Northern Africa and Western Asia. Large education gaps are also found in protracted crises and emergency situations; an estimated 25 million children of primary and secondary school are out of school in conflict zones. Half of refugee children of primary school-age and three quarters of refugees of secondary school-age are not in school.[25]

38. The quality of education remains a challenge around the world. Overall, children stay in school longer, but many do not acquire basic literacy and numerical skills. Recent learning assessment studies show that in 9 of 24 sub-Saharan countries and 6 of 15 Latin American countries with data, fewer than half of the students at the end of primary education had attained minimum proficiency levels in mathematics. In 6 of 24 sub-Saharan countries with data, fewer than half of the students who finished their primary schooling had attained minimum proficiency levels in reading.[26] Recruitment and increased training of teachers in pre-primary, primary and secondary education, in particular in sub-Saharan Africa, is needed to reverse this trend.

39. Education results are also distributed unevenly within countries. In all countries with data, children from the richest 20 per cent of households showed greater proficiency in reading than children from the poorest 20 per cent of households. Remoteness is often a barrier to children's access to education in rural or remote areas, including small islands. In most countries with data, urban children scored higher in reading than rural children.[26] In rural areas teacher quality is lower, pupil-to-teacher ratios are higher, and teacher retention and teacher absenteeism are major concerns.[27]

40. The lack of basic skills is perpetuated during adolescence and hampers the transition of youth into the labour market. In low-income countries, 31 per cent of youth have no educational qualifications at all, compared with 6 per cent in lower middle-income countries and 2 per cent in upper middle-income countries.[28] An insufficient supply of tertiary graduates is well documented even in high-income countries, as evidenced by the rising "college premium" in wages and growing inequality. By 2020 the world could lack 40 million workers with tertiary degrees,

[23] See E/2017/66.

[24] United Nations Educational, Scientific and Cultural Organization (UNESCO), "Six ways to ensure higher education leaves no one behind", *Policy Paper 30*, (Paris, 2017). Available from http://unesdoc.unesco.org/images/0024/002478/247862E.pdf.

[25] UNESCO, *Global Education Monitoring Report* (Paris, 2016). Available from http://en.unesco.org/gem-report/.

[26] See E/2017/66.

[27] Centre for International Teacher Education, "Rural teachers in Africa: A report for the International Labour Organization". Working Paper No. 312 (Geneva, International Labour Office, 2017).

[28] International Labour Organization, *Global Employment Trends for Youth 2015: Scaling up investments in decent jobs for youth* (Geneva, International Labour Office, 2015).

relative to demand, and have an oversupply of up to 95 million workers with a low and medium-level education.[29]

41. As a high degree of technical knowledge is no longer a guarantee for employment and working poverty is a reality for many, a priority for human resources development is addressing the mismatch between a higher skilled workforce and the supply of decent jobs. Ensuring opportunities for all young people will require targeted human resources development policies, including strategies to facilitate the transition from the classroom into decent jobs. Furthermore, young women are finding the transition from school to work much harder and are more likely to end up in lower quality jobs or to be unemployed than their male counterparts. The long-term investments required to adjust education and training systems may seem daunting, yet, enabling youth to participate fully in the workforce and in public affairs will be critical in order to ensure inclusive and sustainable societies.

A. Skill sets for the twenty-first century

42. Nineteenth century industrialization laid the foundation of contemporary societies, including their educational systems. Today, the transformative and possibly disruptive potential of technological change implies a reassessment of education and training programmes, while, at the same time, it may provide innovative solutions to do so. Many countries have already begun exploring new ways to equip their citizens with the skills needed to turn qualifications into jobs in the global economy.

43. Foundational education, in particular reading fluency and numeracy, remains the starting point for human resources development and continues to be a priority in many countries. Without these foundational skills, learners and workers will face significant challenges in the changing and uncertain job market of the future. However, as ICTs make expert knowledge accessible in an unprecedented manner, the emphasis on formal education is shifting from fact acquisition and memorization to analytical and critical thinking.

44. New jobs are more likely to be created in sectors that involve complex problem-solving or that are highly context-specific than in more scripted or routinized tasks, such as in production or manufacturing. Formal technical knowledge coupled with cognitive skills and behavioural competencies will therefore be increasingly important as these skills are less likely to be replaced by technology.

45. Going forward, education will need to focus more on life competencies that go beyond basic skills and can be transferred across disciplines. Public education systems in 113 countries have broadly defined education to include competencies preparing individuals to navigate the complex challenges of our time. These competencies include problem-solving, communication and collaboration skills, digital literacy and service learning, behavioural skills such as perseverance and social intelligence and personality traits such as imagination and creativity.[30] The targets of Sustainable Development Goal 4 reflect a similarly holistic approach,

[29] Richard Dobbs and others, "The world at work: Jobs, pay and skills for 3.5 billion people" (McKinsey Global Institute, 2012). Available from http://www.mckinsey.com/global-themes/employment-and-growth/the-world-at-work.

[30] Esther Care and others, "Skills for a changing world: National perspectives and the global movement" (Washington, D.C., The Brookings Institution, 2017). Available from www.brookings.edu/wp-content/uploads/2017/03/global-20170324-skills-for-a-changing-world.pdf.

focusing on relevant and effective learning outcomes, access to quality early childhood development, technical and vocational skills as well as education for sustainable lifestyles and global citizenship.[31]

Lifelong learning

46. Comprehensive approaches encompassing formal education and life competencies throughout the lifecycle will be critical to effective participation in a fast-changing world of work. There is growing recognition that countries need to invest in early childhood development to equip children with basic skills. "Learning and relearning" should be a lifelong process, offering continuous education opportunities that will help to leave no one behind and to ensure that everyone benefits from technological change.

47. A change of mind-set is required to perceive change and disruption as an opportunity to acquire new skills, rather than a threat. Therefore, lifelong learning will be critical and will require the provision of multiple and flexible learning pathways at all ages and educational levels. Learning "how to learn" and transferable, "soft" skills such as teamwork, leadership, management, client-orientation and mediation are increasingly valued. They are associated with the ability to reskill and to adapt to different work environments, thereby improving the chances of staying gainfully employed.

Technological literacy

48. "Soft skills" are also considered to be fundamental and complementary to the acquisition of more technological skills. Digital learning platforms have proven successful for learners at various stages of life, including gamified learning for children, online tertiary-level learning, self-paced adult up skilling and formal technology-enabled on-the-job training.[32] However, the 3.9 billion people worldwide who do not have access to the Internet, are excluded them from such opportunities.[33]

49. Technological literacy has become a main requirement to gain employment and in many societies, it constitutes an essential element for full participation fully in public life. Many young people use the Internet, yet the majority do not possess job-relevant digital skills. To foster basic technological literacy, and to spur innovation, some countries have set up comprehensive frameworks to incentivize children's interest in science and mathematics, as well as to promote the effective use of technology.

50. The use of computers and the Internet has been integrated into school curricula, facilitating the provision of learning content and providing additional channels for teachers and students to interact. Based on data from 65 developing countries, on average the percentage of schools with access to computers and the Internet for teaching purposes is above 60 per cent in both primary and secondary education.[34] However, in more than half of sub-Saharan countries for which data is available, less than 40 per cent have access.[34] In developed countries, the effective use of ICTs in classrooms was found to be hindered by two key factors, a shortage

[31] See General Assembly resolution 70/1.

[32] World Economic Forum, *Human Capital Report 2016* (2016). Available from http://reports.weforum.org/human-capital-report-2016/.

[33] International Telecommunication Union, *ICT Facts and Figures 2016*. Available from www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2016.pdf.

[34] See E/2017/66.

in materials and the lack of adequate teacher training. Only 37 per cent of school teachers recently reported frequently using practices involving ICTs.[35]

51. In many countries, customized mobile phone applications are used to promote education and learning. The digital divide, however, still excludes many from the interconnected world of work and often goes together with the "electricity divide". Separating those with the competencies and skills to benefit from computer use from those without creates a "second digital divide"[36] and risks exacerbating inequalities. Closing the digital gap is therefore critical for the future of education as well as the future of work.

Intercultural skills and education and training for sustainability

52. In the interconnected and mobile world of work, intercultural skills, including language skills and respect for diversity, are considered critical to help learners become responsible global citizens. Tacit knowledge of diverse social and cultural contexts enable more effective teaching and mentoring, negotiation and coordination. Enhanced collaboration across disciplines is also important in order to grasp and address complex, multidimensional challenges. Expert knowledge will need to be complemented by a thorough understanding of the interlinkages between disciplines.

53. Education for sustainable development at all levels builds awareness of the related challenges encompassing the economic, social and environmental dimensions. Education for sustainable development has been recognized as a crucial element of quality education, seeking to empower everyone to contribute to sustainable development and, at the same time, strengthening education in all agendas and programmes that promote sustainable development.

54. "Green skills" have emerged as a response to global environmental concerns and they will need to be provided by education and training systems in preparation for the transition towards an inclusive economy with sustainable models of production and consumption. Initiatives on "greening" vocational training[37] are targeted at educating and training individuals to be part of a "green" workforce, for example, through the acquisition of diagnostic skills to calculate carbon footprint or through training on energy efficiency as supplements to existing skills.

B. Inclusive human resources development

55. New ICT tools and other technological innovations have the potential to democratize learning opportunities in the long term and to accelerate human resources development. An equitable expansion of education is likely to reduce inequality, lifting the poorest out of poverty. In the short term, however, advances in technology risk disproportionally benefiting those who can build on an advanced level of education and have access to a networked infrastructure. Continued investments in improving the quality of basic skills development and mending the digital divide therefore remain important enablers for inclusive human resources development strategies.

[35] Organization for Economic Cooperation and Development (OECD), "Skills for a Digital World: Background Report for the 2016 Ministerial Meeting on the Digital Economy", OECD Digital Economy Papers No. 250 (2016).

[36] World Bank, *World Development Report 2016: Digital Dividends* (Washington, D.C., 2016).

[37] UNESCO, *Greening Technical and Vocational Education and Training. A practical guide for institutions* (Paris and Bonn, UNESCO, 2017). Available from www.unevoc.unesco.org/go.php?q=page_greening_tvet.

Democratizing learning opportunities

56. In low-income countries, technology may improve access to education for children in remote areas. While Governments bear the primary responsibility for providing their citizens with quality foundational education, many of these innovative solutions have been initiated by philanthropic and civil society organizations and communities to complement governmental efforts where progress is slow.

57. Philanthropic initiatives in the education sector have also multiplied in industrialized countries, often supporting local school districts. Some colleges and initiatives offer free or low-fee education programmes in disadvantaged communities. Private capital is thus increasingly being invested in an area that traditionally has been considered to be within the purview of Governments.

58. In some contexts, however, the privatization and commercialization of quality basic education has led to discriminatory and inequitable education systems.[38] Similarly, many continuous learning programmes assume that people have the resources, flexible working hours and, above all, the motivation to retrain. Putting in place a regulatory framework that establishes minimum norms and standards for the creation and operation of educational services, as well as setting incentives for a continued commitment to learning, will be critical in this regard.

59. Many countries have a longstanding tradition of offering courses at no cost or low cost through community colleges and open universities. "Skills guarantees" have emerged in Australia and Europe, which ensure education and training entitlements for both youth and adults. The "SkillsFuture" initiative in Singapore provides an example of a Government-led initiative that makes continuous training accessible and affordable, in collaboration with the private sector. Introduced in January 2016, the initiative offers every citizen of Singapore over 25 years-old a credit to pay for training courses provided by certified providers. It also offers subsidies to Singapore citizens over 40 years of age to incentivize lifelong learning. Participating companies indicate the changes that they deem most important over the next few years, which are used to populate "industry transformation maps" used to guide citizens in their selection of courses.

60. In the higher education sector, specialized classes in the form of massive open online courses have spread widely and continue to improve. Likewise, professional networking platforms and online training businesses providing on-demand training have soared. These online resources appear to be well-suited to learners and workers needing to upgrade their knowledge and skills in a flexible way. Early experiences from universities offering online degrees have shown that these courses do not hamper on-campus enrolment but target people that seek to deepen their knowledge while remaining in their jobs. Massive open online courses appeal to employers looking to retrain their workforce and have the potential to address shortcomings of current workforce training arrangements. While it is still early to determine the long-term success or failure of these technologies,[39] they offer the opportunity to broaden access to university degrees and specialized training.

Investing in teachers

61. Technological progress requires that education systems to adjust, while providing innovative solutions to deliver learning content for the acquisition of skills for the twenty-first century. Synergies can be created between technology and education to open learning opportunities for all at relatively low or no cost.

[38] See Human Rights Council resolution 35/2.

[39] Organization for Economic Cooperation and Development (OECD), "Skills for a Digital World".

62. E-learning platforms, artificial intelligence and the data revolution have changed ways of teaching and can help improve the quality and responsiveness of teacher-student interactions. Educational and professional training programmes can be tailored to the level of knowledge of a given learner, and peer-to-peer learning fosters collaboration skills in addition to the acquisition of knowledge.[40] Innovative approaches to teaching include the use of simulation tools for preparation and training. Advances in technology may also open new avenues for increased accountability in monitoring learning outcomes.

63. Since education is context specific, teachers are the main resource in the classroom. As more dynamic labour markets emerge, skills systems face constraints due to shortages of teachers and trainers, managers, evaluators and instructional designers.[41] Investing in quality teacher training, including the capacity to teach digital skills, will therefore be critical. Teachers' education and specific policies to promote continuous training, with a strong emphasis on pedagogical knowledge and innovation, will yield long-term results.

IV. Institutional requirements: strategies for human resources development

Human resources development as a central component of national sustainable development strategies

64. The implementation of the 2030 Agenda for Sustainable Development will require policy integration at all levels, supported by effective institutions and adequately skilled human resources. Human resources development as part of the national sustainable development strategies should be informed by multi-stakeholder engagement to ensure policy integration and coordination. Although some countries have begun this process, too few have prioritized the emerging core skills needed in national sustainable development strategies.[42]

65. The growing interconnection between local and global development challenges are key features of the Sustainable Development Goals. Institutions supporting human resources development will have an important role to play to support countries' intrinsic capabilities to address the breadth of issues contained in the Sustainable Development Goals and to integrate the Goals and targets into policies and efforts to achieve them. While there is no "one size fits all" approach, there are elements that can be identified that contribute to effective human resources development as a pillar of integrated national sustainable development strategies.

66. Human resources development strategies will not succeed without a thorough understanding of the underlying patterns of inequality and a commitment to equality of opportunity. Ensuring broad access to training opportunities, in particular for those groups facing greater difficulties such as youth, lower-skilled workers, workers with disabilities and workers in rural communities, will be critical to build inclusive societies and move towards a truly sustainable future.

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[40] Kiira Kärkkäinen and Stéphan Vincent-Lancrin, "Sparking Innovation in STEM Education with Technology and Collaboration: A Case Study of the HP Catalyst Initiative", OECD Education Working Papers, No. 91, (OECD, 2013). Available from www.educationinnovations.org/research-and-evidence/sparking-innovation-stem-education-technology-and-collaboration-case-study-hp.

[41] Michael Axmann and others, "Vocational Teachers and Trainers in a Changing World: The Imperative of High Quality Teacher Training Systems", Employment Policy Department, Working Paper No. 177 (Geneva, International Labour Office, 2015).

[42] Paula Brewer and Paul Comyn, *Integrating core work skills into TVET systems: Six country case studies* (New Delhi, International Labour Office, 2015). Available from http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_470726.pdf.

Education and training systems reform

67. Successful human resources development strategies will require long-term investments in inclusive and equitable quality education and training, as well as in lifelong learning opportunities for all. Some countries continue to face difficulties in providing access to foundational skills, and in providing adequate school infrastructure, including sanitation and electricity. The quality of education systems is a challenge in many parts of the world, including in industrialized countries. Policies that recognize the interlinkages between skills development, gains in productivity, employment opportunities and the transition towards sustainable economies will therefore be critical.

68. Countries are already seizing the opportunities to reform their education systems in line with the demand for new skills. Yet, many are struggling to include new skills needed in an interconnected world of work in curricula, and consequently face challenges in effectively teaching them. Public education systems will therefore need to respond to a vast array of challenges, many of which shift at a quick pace. As there is no "one size fits all" approach, such reforms will require a thorough assessment of the national education system along with political and financial commitments.

69. Globally, early childhood education, which facilitates subsequent learning phases, has been recognized as a critical component of the education system. Cases from both high and low-income countries show that quality early childhood programmes increase educational success in the long run and decrease public expenditures later. Simultaneously, in many countries, a central priority in education reform has shifted from enrolment, especially at the primary school level, to focusing on quality learning outcomes. This has involved the increasing use of international tests for benchmarking, as well as the growth of school governing boards comprised of teachers, parents and community members to support accountability.

70. In the higher education sector, systems thinking and interdisciplinary approaches are gaining prominence as a means of innovation. However, distinct disciplines still face difficulties in communicating the evolution of their individual fields, owing to the use of different methods and standards. Likewise, the funding structure of higher education is organized in silos. Interdisciplinary projects, run longer than conventional projects and are therefore costlier. Countries have embraced interdisciplinary approaches very differently and a strategic vision for research that encompasses multiple disciplines has yet to be formulated in many parts of the world.

71. The inclusion of lifelong learning as a priority within the Sustainable Development Goals presents new opportunities for adult education in global development frameworks. However, the current fragmented approaches and limited funding will continue to hamper its potential. Adequate political and financial will is needed to create effective lifelong learning systems that can provide additional institutional capacity to support learning for work in the future.

72. Consequently, human resources development strategies have generally proven successful when targeting three main objectives: matching supply to current demand for skills; helping workers and enterprises adjust to change; and building and sustaining competencies for future labour market needs.[43] Those objectives can be achieved through quality education for all that lays a strong foundation for future

[43] International Labour Organization, *A Skilled Workforce for Strong, Sustainable and Balanced Growth: A G20 Training Strategy* (Geneva, International Labour Office, 2012). Available from www.oecd.org/g20/summits/toronto/G20-Skills-Strategy.pdf.

training and employment opportunities. Building bridges between the world of work and training to improve the skills match are equally important. Continuous workplace training and lifelong learning also play important roles. Furthermore, sustained dialogue between employers and trainers, coordination across government institutions, adequate labour market information, employment services and performance reviews are all steps to inclusive human resources development strategies that identify skills needs early on, and thereby support innovation, investment, economic diversification and competitiveness.[43]

Building pathways from education to employment

73. Successful human resources development will require better connections between education and employment so as to turn qualifications into jobs. Some countries have prioritized technical and vocational education and training as a pathway to employment and to provide a better and more nimble response to changing labour market needs. However, Governments are being challenged to adapt vocational education models to encompass the full range of necessary skills, including interdisciplinary training and lifelong learning.

74. Vocational training has proven to be a successful model for public-private partnerships in the education sector. Education and training institutions can benefit from the dialogue with, and insights from, the private sector to ensure that training keeps pace with employers' evolving needs. Universities and industries can build on longstanding experiences of working together on large-scale research projects.

75. Closer collaboration will also be required across Government ministries in order to devise integrated strategies encompassing public policies in the areas of education, youth, industrialization and rural development. As education is increasingly interwoven with work, enabling employees to reskill throughout their careers, existing public-private partnerships will need to be scaled up to support learners in the workplace. Governments will also need to strengthen the incentives they provide for companies and individuals to invest and participate in lifelong learning and training.

76. Commercial providers of continuous education programmes report the challenge of an ever more diversified learning market in which Governments are not the only providers of education. This will require public education institutions to strengthen accountability frameworks to certify and thereby guarantee the quality of educational programmes provided by other actors. More fluid skill sets may also require a review of the narrow occupational classifications that inform the development of competency standards and qualifications.

Strengthening social protection systems and labour standards

77. One of the greatest achievements made in the twentieth century was the growth of organized labour and the development of a framework for social dialogue and labour regulations. This resulted in the establishment of international labour standards and other mechanisms for promoting workers' rights and well-being, including the recognition of access to social insurance as an essential human right.[44]

78. Such protection framework was designed in response to, and largely dependent on, a formal labour market where workers were steadily employed and economic growth was stable and strong. Thus, coverage from such protections has been less

[44] Louise Fox, "Why are worker benefits and protections so limited in developing economies?", Brookings Blum Roundtable 2016 Post-Conference Report (Washington, D.C., The Brookings Institute, 2017). Available from www.brookings.edu/wp-content/uploads/2016/07/Global_20160720_Blum_FoxWeb.pdf.

successful in developing countries. Only 27 per cent of the world population has access to comprehensive social security systems, even though all countries have taken steps to develop them.

79. The stubborn challenges of weak growth, low productivity and informal and vulnerable employment in developing countries have posed challenges to the development of organized labour and subsequent social protection programmes they have historically helped to produce. This is a trend driving uncertainty about the future of work in developing countries, in particular the absence of strong, well-defined labour movements and the limited role for collective bargaining. Whatever progress is made in this area, it is likely that it will not easily replicate what came before. Instead, significant innovation will be required to advance workers' rights, especially in developing countries, and regulating decent work considering the changing employment landscape.[7]

80. Innovative solutions to extend social protection and to enable investment of skills and continuous lifelong learning opportunities, social dialogue and collective bargaining are also critical for new forms of jobs and businesses outside the standard forms of employment, for example, short-term labour or "gig economy" jobs. Transition from the informal economy to formal economy, including through promotion of cooperatives and other solidarity economy enterprises present opportunities as well.

81. Universal basic income is currently high on the agenda as a possible policy option for supporting income security in the face of new forms of work, digitalization and automation, including from informal and precarious employment. However, there are a wide diversity of proposals, which differ dramatically regarding: the level of the proposed basic income; the coverage of recipients; possible financing modalities; reconfigured social protection systems to make space for universal basic income; and potential economic and social impacts. Feasible models across different contexts need further exploration.

V. United Nations: retooling for implementation

82. The universal and integrated nature of the 2030 Agenda for Sustainable Development requires coherent efforts at all levels to leave no one behind, including through increased capacity development and international cooperation. This has direct implications for the support of the United Nations for the human resources development efforts of Member States as part of the overall implementation of the Sustainable Development Goals. It also implies changes to the development of human resources of the Organization.

83. The United Nations provides integrated policy advice to support countries in the implementation of the 2030 Agenda, and its support in broadening their human resources base in areas such as institution-building, statistical capacity and policy planning, management and evaluation will be critical to sustain development gains over time. At the national level, the principle of "leaving no one behind" has been integrated as one of the guiding principles in the United Nations Development Assistance Framework that orients United Nations country-level programming in line with the 2030 Agenda and national priorities and strategies.

84. United Nations entities are increasingly tapping into the potential of innovation and technology to foster human resources development. The International Telecommunication Union (ITU) and the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women) use tools to reduce the digital divide, making ICTs training available, especially for women and girls,

youth and marginalized communities. UN-Women virtual skills school seeks to enable young women to acquire new skills through an open platform offering diverse learning pathways. The ITU Academy offers training in the ICT sector for indigenous peoples and has compiled online training materials in its ICT resources for youth employment and entrepreneurship database.

85. The United Nations Educational, Scientific and Cultural Organization (UNESCO) provides support for countries to develop and reform their education systems at all levels, in all settings, so that all learners are prepared for a rapidly changing global labour market. Moving towards knowledge-based societies, UNESCO helps develop evidence-based policies in response to new trends and works to make higher education more inclusive. The UNESCO Strategy for Technical and Vocational Education and Training 2016-2021 aims at supporting countries in transforming their technical and vocational education and training systems.

86. In response to high levels of youth unemployment, the Global Initiative on Decent Jobs for Youth, launched in 2016, provides a template for an issue-based, United Nations inter-agency initiative in support of countries. Working around eight interconnected themes, including digital and entrepreneurial skills as well as quality apprenticeships, the initiative brings together the expertise of 21 entities to tackle the challenge of youth unemployment. It also provides a platform to operationalize global partnerships beyond the United Nations system to catalyse action on strengthening youth's human capital and facilitating transitions to labour markets.

87. Advances in technology allow the United Nations system to deliver programmes in innovative ways. At the same time, technological change and its potential impacts on societies at large reshape the United Nations policy research work and its normative agenda. Important issues stemming from science and technological innovation, such as automation and artificial intelligence, require a collective response from Governments to fully address both intended and unintended consequences. United Nations leadership, guided by policy research, will be required to navigate the changes, which will influence the international community's ability to implement the 2030 Agenda.

88. The United Nations can capitalize on its unique "knowledge ecosystem" of normative and operational expertise. The breadth of the 2030 Agenda requires, however, a review of the specific skill sets needed. A more effective, results-oriented and agile Organization will require better knowledge management across the pillars of its work, and, at the same time, new expertise in areas where gaps have been identified. This also includes strengthening cross-cutting technical skills on the formulation of integrated policy advice to Governments.

89. Moreover, the policy work of the system will need to be underpinned by strengthened capacity for data literacy, technology, disaggregated data collection and analysis, partnerships and joint resource mobilization. Knowledge resources are an important component of the capacity of the United Nations system to support countries. Yet, the capacity of the system to act coherently and fully capitalize on its expertise is hampered by fragmented knowledge management and databases. Introducing or strengthening knowledge management strategies and policies towards a common and accessible knowledge base will therefore be critical.

90. Retooling the United Nations to effectively support human resources development in the twenty-first century will therefore require investments in the Organization's own workforce, putting people at its centre and supporting the efforts of Member States to deliver on the promise to leave no one behind.

VI. Key messages and policy recommendations

91. Policies rooted in the principles of equity and sustainability can mitigate the impact of key trends in the world of work, and help anticipate their effects. Experience shows that technological change can be accompanied by broad-based growth, job creation and expanded opportunities for education, learning and innovation.

92. Cutting-edge breakthroughs in science and technology are likely to continue and to accelerate. Although the impact of those developments will not necessarily be neutral, their deployment offers new opportunities for the improvement of individual livelihoods and the fostering of collective innovation with the support of relevant education and skills development, as well as necessary infrastructure.

93. The future of work, shaped by progress in science and technology, implies a shift towards lifelong learning and a transformation towards comprehensive, lifecycle approaches to education and training. In an ever faster changing world of work, adaptability and the willingness to reskill become key to success to match trends in the global economy.

94. There will be a need for continued investments in the quality of basic skills development, ideally during early childhood. The education of teachers and the breaching of the digital divide remain critical enablers for inclusive human resources development strategies.

95. Policies should focus on promoting transitions from non-standard, vulnerable and informal arrangements, to more stable employment and decent work, as well as promoting adequate social protection for those in all types of employment. Global supply chains can contribute to new sources of growth and opportunity, but the quality of employment and the need for social advancement require additional effort among all partners from the Government, the private sector and organized labour.

96. Large-scale investments are needed in transformative education, skills and decent job creation to address health and social workforce supply and demand mismatches. This will build the human capital required to achieve and sustain universal health coverage and global health security, create decent jobs required for the achievement of the Sustainable Development Goals, reduce youth unemployment, enhance women's economic empowerment and participation and achieve inclusive economic growth.

97. Member States should adopt and implement comprehensive human resource development strategies premised on national development objectives that ensure a strong link between education, training and employment; that help to maintain a productive and competitive workforce; and that are responsive to the needs of their national economy, society and sustainable development.

98. To keep pace with advances in technology and changing skill sets, the United Nations system should strengthen its approach to human resources development internally, with Member States and with its external partners. The vision and the leadership by the United Nations, and its partners, are required at all levels both in order to anticipate the transformations in the world of work and the needed changes in education that is needed, as well as to ensure that human resources frameworks are inclusive.

99. The United Nations development system has aligned its work with the 2030 Agenda and is changing its ways of working to ensure that it provides effective support for implementation, including through human resources development, as a global knowledge hub, and as a venue for devising multilateral pathways to address sustainable development challenges.